

Patent
Attorney Docket: 54014.8101.US01

Amendments to the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1. (Amended) A method for producing a lignin derivative, said method comprising the step of binding an oxygen atom of the hydroxyl group and a β -positional carbon atom of a diphenylpropane unit contained in a lignophenol derivative, where the diphenylpropane unit is formed by binding a carbon atom at an ortho-position relative to a phenolic hydroxyl group of a phenol derivative to a carbon atom at a benzyl-position of a phenylpropane unit of lignin, to obtain an arylcoumaran derivative containing an arylcoumaran unit in which a coumaran skeleton is bound to an aromatic ring of the phenylpropane unit of lignin.

Claims 2-7 (cancelled)

8. [New] The method according to Claim 1, said method further comprising the step of adding an acid to a lignin solvated with phenol derivative to convert a phenylpropane unit of lignin into a diphenylpropane unit by grafting the phenol derivative to the phenylpropane unit.
9. [New] The method according to Claim 1, wherein said binding step heats the lignophenol derivative under alkali conditions such that the phenolic hydroxyl group of the phenol derivative can dissociate.
10. [New] The method according to Claim 1, wherein the phenol derivative comprising one or more of monovalent phenol derivative, divalent phenol derivative, or trivalent phenol derivative, and

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the phenolic hydrogen group of the phenol derivative comprising at least one unsubstituted ortho-position.

11. [New] The method according to Claim 10, wherein the phenol derivative comprising a phenol, a cresol, methoxyphenol, a naphthol, a catechol, a resorsinol, a pyrogallol or a combination thereof.
12. [New] The method according to Claim 1, said method further comprising the step of adding an acid to a lignin solvated with phenol derivative to convert a phenylpropane into a diphenylpropane unit by grafting the phenol derivative to the phenylpropane unit, where a carbon atom at an para-position relative to a phenolic hydroxyl group of the phenol derivative is bound to a carbon atom at a benzyl-position of the phenylpropane unit of lignin, to obtain a lignophenol derivative.
13. [New] The method according to Claim 1, wherein the lignin derivative further comprising an additional phenylpropane unit of lignin.
14. [New] A lignin derivative comprising:
an arylcoumaran unit in which a coumaran skeleton is bound to an aromatic ring of a phenylpropane unit of lignin; and
a diphenylpropane unit formed by binding a carbon atom at an ortho-position and/or a para-position relative to a phenolic hydroxyl group of a phenol derivative and grafting the phenol derivative to a benzyl-position of a phenylpropane unit of lignin.

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15. [New] The lignin derivative according to Claim 14, wherein the phenol derivative comprises monovalent phenol derivative, divalent phenol derivative, or trivalent phenol derivative, or combinations thereof, and a phenolic hydrogen group of the phenol derivative comprising at least one unsubstituted ortho position.
16. [New] The lignin derivative according to Claim 15, wherein the phenol derivative comprising a phenol, a cresol, methoxyphenol, a naphthol, a catechol, a resorsinol, or a pyrogallol, or a combination thereof.
17. [New] The lignin derivative according to Claim 14, further comprising a phenylpropane unit.
18. [New] The lignin derivative according to Claim 14, having a weight-average molecular weight of about 500 to 2000.
19. [New] A molded product comprising the lignin derivative according to Claim 14.
20. [New] The molded product according to Claim 19, wherein a molding substrate material is molded to obtain said molded product, said molded substrate material comprising a chip-like material, fibrous material, and powdery material or combinations thereof.
21. [New] The molded material according to Claim 20, wherein the molding substrate material comprises cellulose.
22. [New] A method for producing a molded product comprising the step of using the lignin derivative according to Claim 14 to obtain a molding substrate material.

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23. [New] The method according to Claim 22, further comprising the step of dissolving the lignin derivative in a solvent to form the molding substrate material and evaporating the solvent.
24. [New] The method according to Claim 23, wherein the solvent comprises acetone, ethanol, methanol, dioxane, or tetrahydrofuran, or the combination thereof with water.
25. [New] A method for treating a molded product, said method comprising the steps of:
(a) adding a solvent having affinity for the lignin derivative according to Claim 14 to a molded product containing the lignin derivative; and
(b) recovering the lignin derivative.
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26. [New] The method according to Claim 25, wherein the molded product comprises cellulose.
27. [New] The method according to Claim 25, wherein the solvent comprises acetone, ethanol, methanol, dioxane, tetrahydrofuran, or the mixture of any one of them with water.
28. [New] The method according to Claim 25, wherein said step (b) comprises soaking the molded product into the solvent.
29. [New] The method according to Claim 25, wherein said step (b) further comprises recovering molding substrate material of the molded product.

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Conclusion

Each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, Applicants respectfully request that Examiner pass this application to issue.

Respectfully submitted,
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